REMARKS

Reconsideration of this application is respectfully requested in view of these remarks.

The amendments to the specification have been made to correct evident typographical errors, and the last claim has been renumbered as claim 27 to correct the misnumbering.

The office action recognizes that none of the cited references discloses the structures claimed as the invention, but asserts that the claimed structures are obvious over various combinations of the references. It is respectfully submitted that these grounds of rejection do not recognize the subtlety by which it works.

The invention relates to a light fixture with a motion detector head that can be moved typically up and down and side to side to aim the head so as to adjust the field of view that the motion detector monitors. For example, when the head is tilted downward, the motion detector does not look as far out and the monitored field of view in front of the motion detector is effectively shortened. This is a common motion detector arrangement typically used with a pair of flood lights. The particular problem addressed here is how to monitor an area underneath and behind the motion detector housing without degrading the performance of the motion detector.

Prior art solutions to this problem are twofold. In one approach the motion detector housing has a forward-looking lens that sometimes also wraps around to the sides. To monitor behind the motion detector housing, the lens is wrapped around to the sides substantially perpendicularly to the forward direction or even somewhat more so as to focus infra-red energy from a backward and downward zone to a sensor in the motion detector housing. This is the solution depicted in applicants' FIG. 2A labeled "prior art." Such motion detectors are described in the "Background of the Invention" section of the specification. (See the specification at pp. 5-6.) Another approach is taken in the Schwartz reference cited in the office action. Schwartz simply cuts a window in the rear of the motion detector housing and adds sufficient mirrors or other optical elements to the optical system so that the area behind the motion detector is covered through the rear window.

These approaches generally represent a compromise in performance. In the first approach the lenslets at the sides for monitoring zones behind the motion detector housing have reduced effectiveness. The optical path for rearward zones generally is at a steeper angle to the lenslet so it is at the edge of the lenslet's field of view. If a single infra-red sensor is used in the motion detector housing, then the optical arrangement is usually optimized for primarily forward detection. The rearward detectability tends to be whatever can be achieved after the forward detectability is optimized. Alternatively, extra optical elements such as reflecting surfaces can be added to direct the infra-red energy from the rearward zones more perpendicularly to the sensor surface. This puts up the cost of the motion detector and also introduces some signal loss at each reflection. In the Schwartz approach, added optical elements are needed to direct the infra-red energy from rearward zones to the sensors. Moreover, in Schwartz the rearward zones are directed primarily backward and their downward bent is limited by the bottom of the rear window.

Both approaches lead to a false activation problem. Namely, as the motion detector head is tilted down so as to shorten the range that the head looks forward, the rearward zones are raised. There are two problems with this. First, the rearward zones become less than optimally aimed to monitor the desired area behind the motion detector housing and can even become so mis-aimed as to leave undesired gaps in the monitored area. Optimizing the aim of the forward-looking zones usually means de-optimizing the aim of the backward-looking zones. The second problem is that the rearward-looking zones can be raised enough that at least a portion of a rearward zone looks skyward. (See applicants' FIG. 2B.) It does not take much of a downward tilt of the head before some of the backward-looking zones turn upward toward the sky. This can lead to false activations since the motion detection circuitry is normally not optimized to look at the sky.

Applicants' claims are directed to a motion detector arrangement that improves upon the deficiencies of the two prior-art approaches just described. Applicants' claimed invention is not merely directed to the goal of detecting motion behind detector (as in Schwartz, for example), but is subjected to limitations on the backward zones to keep from cutting back the coverage of the rear area when the forward monitored area is shortened and to limit the likelihood of false activations.

The claimed invention reduces these limitations with a new arrangement that is plainly not shown or even hinted at in the cited references, which do not even recognize the problem and, all the more so, do not suggest a solution, and certainly do not suggest the solution of applicants' claims.

The cited combination of references does not show or suggest monitoring the region behind the motion detector primarily with detection zones emanating through at least one downward-looking window, while the front region is monitored with detection zones through at least one forward-looking window; does not recognize the false activation problem that can arise with known motion detectors that monitor in back of the motion detector with extra-wide-angle zones from the "forward-looking" window (here in quotes because although called forward looking, it also allows wide-angle detection zones to look backward to some extent); and does not recognize that using a downward-looking window for separate detection zones that look backward can actually help the false activation problem while giving better rear coverage. The use of the downward-looking window provides a different arrangement of optical paths not shown in the prior art. The zones through this window are primarily downward-looking and they generally angle forward or back or to the side. The downward window has a great advantage not generally recognized. The zones defined through the downward window can be achieved with a simpler optical path and can be better optimized for detection in the downward/rearward direction. In addition, more downward zones can be achieved through the downward window to accommodate a greater range of movement of the motion detector head. As one zone may be moved "off target," it is easier to fit in another zone that moves in to take the place of the one that has just moved off target.

In addition, the characterizing part of claim 1 requires that the zones of the second zonal pattern through the downward-looking window be "angulated and disposed with respect to said far level of vision such that one or more of the zones of said second zonal pattern will be in disposition for monitoring the field behind said motion detector housing when said far field is aimed at said various positions." This is a limitation on the disposition of zones that cannot be gleaned from any of the cited references.

The characterizing part of claim 21 includes the same sort of language as claim 1 except that here the claim specifically addresses the notion of an offset angle, which is discussed in the specification at the top of page 14. (See the angle 94 in FIG. 7.) See also the discussion starting at page 22, line 19, where the offset angle β_{offset} is derived.

Claim 22 is directed to a more specific arrangement for achieving the structures of claims 1 and 21, in which at least two sensors are used and the forward and downward/backward monitoring arrangements each have their own sensor. The last wherein clause provides the relationship of zones from the two windows.

Independent claim 18 calls for a specific angular relationship. This angular relationship is called out to help with the false activation problem as discussed in the more mathematical part of the specification. Even if the cited references had made some casual suggestion of the advantages to be gained from backward monitoring through a downward-looking window together with forward/sideways monitoring through a forward-looking window (in fact they make no such casual suggestion), they certainly have no teaching or suggestion of the detailed relationship of claims 18 - 20.

A few comments on the references are now in order. The Schwartz reference looks forward and back through at least two different windows or "optical arrangements," but it does so in a way that is subject to the false activation problem discussed in applicants' specification. Schwartz does not have a generally horizontal downward-looking window as called for in independent claims 1, 21 and 22, nor does it have the second sensor as called for in claim 22. The specific angular relationship given in claim 18 is not even hinted at by Schwartz. The passage of Schwartz at column 3 cited in the office action just teaches the general notion of having rearward detection zones, but does not suggest or even appreciate the geometric subtlety of applicants' claimed arrangements. Schwartz's rearward detection zones pass through one or more windows in the back side of the motion detector housing and are not comparable to the generally horizontal downward window of the claims 1, 21, 22 and their dependants or the angular relationship of claims 18 - 20. This deficiency is not rectified by the other cited references.

The Shpater reference just shows forward detection zones. The point of Shpater is to make use of the two side-by-side subzones generated by a dual element sensor to eliminate false activations from pets. This is the subject of the cited portion of Shpater's

column 3, but it has nothing to do with, and provides no teachings on, the monitoring of the rear region with separate downward zones as in the present claims and shows nothing about the angular relationships between forward and downward/rearward zones of applicants' claims.

The Erismann reference does not even relate to a motion-activated lighting fixture. The Erismann device is a stand-alone motion detector such as used with burglar alarms. In fact, the proprietor of the Erismann reference, C&K Systems, Inc. produces components for burglar alarms, not lighting fixtures. (See the announcement at http://www.bizjournals.com/sacramento/stories/1999/06/07/daily6.html, in which C&K was acquired by Honeywell.)

The undersigned believes that in view of the above explanations the application is now in condition for allowance and action to that effect is respectfully requested. If the examiner feels that there are any lingering issues that can be resolved by telephone or feels that a telephone interview would be beneficial in any way, he is invited to call the undersigned at 510-658-9511.

Respectfully submitted,

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I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office to fax No. 571-273-8300 on the date shown below.

4/7/06
Date

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